

# Autonomous Onboard Failsafe System to Mitigate Common Failure Modes of Experimental SUAS, Phase II

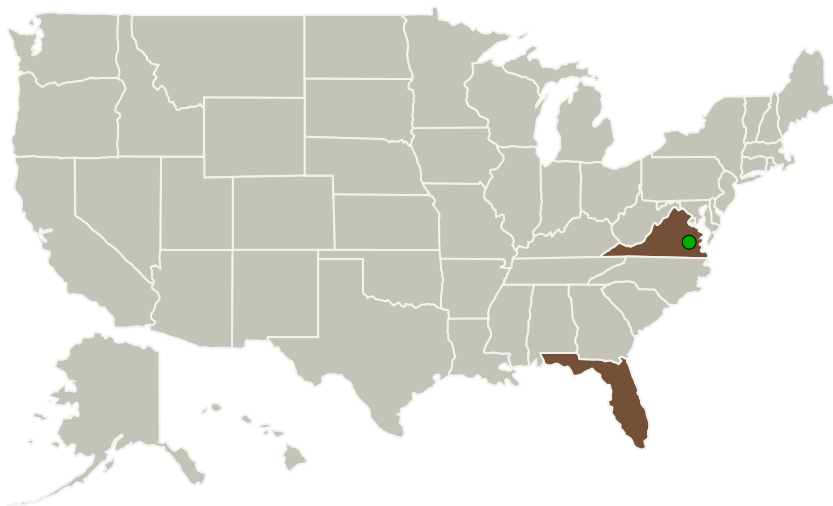
Completed Technology Project (2014 - 2017)



## Project Introduction

Automation improvements are needed to reduce the dependency on human reflexes and unreliable data links. Modern autopilots are capable of detecting loss-of-GPS and loss-of-communications. There is no mechanism for the aircraft to autonomously return to a safe landing zone under these conditions. Furthermore, experience has shown that existing controllers are not good at detecting bad position data caused by intermittent GPS. These conditions are known to cause flyaways. The only existing protection is the operator. There is currently no automation that can protect an SUAS when the flight controller is unable to recognize that the GPS and comm links are unreliable. A unique feature of the invention is a dual onboard flight controller. One is a failsafe controller, and the other is experimental. The failsafe controller allows access to control outputs by the experimental controller. Meanwhile, it detects conditions such as lack of GPS reliability, imminent airspace violations, flight profile violations, imminent loss-of-control, and loss-of-stability by experimental software. If the failsafe controller detects one or more of these conditions, then it autonomously seizes control authority from the experimental flight controller and navigates the aircraft to a pre-determined recovery spot, using visual navigation if necessary. No comm link is required.

## Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Prioria, Inc.	Lead Organization	Industry	Gainesville, Florida
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia
University of Florida	Supporting Organization	Academia	Gainesville, Florida

## Primary U.S. Work Locations

Florida	Virginia
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## Project Transitions

**September 2014:** Project Start**September 2017:** Closed out

**Closeout Summary:** Autonomous Onboard Failsafe System to Mitigate Common Failure Modes of Experimental SUAS, Phase II Project Image

### Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/137541>)

## Images



### Briefing Chart Image

Autonomous Onboard Failsafe System to Mitigate Common Failure Modes of Experimental SUAS, Phase II  
(<https://techport.nasa.gov/image/134351>)

## Organizational Responsibility

### Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

### Lead Organization:

Prioria, Inc.

### Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

### Program Director:

Jason L Kessler

### Program Manager:

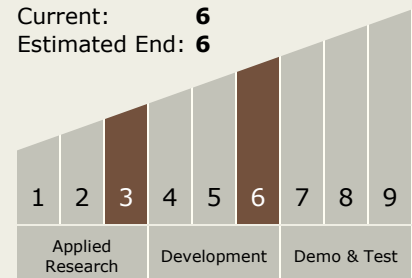
Carlos Torrez

### Principal Investigator:

Walter L Hunt

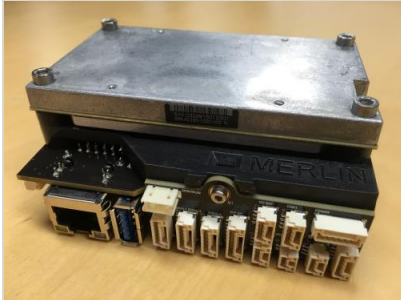
## Technology Maturity (TRL)

Start: 3  
Current: 6  
Estimated End: 6



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## Final Summary Chart Image

Autonomous Onboard Failsafe System to Mitigate Common Failure Modes of Experimental SUAS, Phase II Project Image  
(<https://techport.nasa.gov/image/125759>)

## Technology Areas

### Primary:

- TX17 Guidance, Navigation, and Control (GN&C)
  - └ TX17.2 Navigation Technologies
    - └ TX17.2.3 Navigation Sensors

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System